

PE Hair Recovery and Preservation

A. SCOPE

- A.1 The identification of the source of apparent hairs during a criminal investigation can often be valuable in demonstrating physical contact between a suspect and a victim or a suspect or victim and a crime scene.

Hair roots that are in the actively growing phase (the anagen phase) contain numerous nucleated cells in the root and surrounding follicular tissue making them suitable for nuclear DNA analysis. However, the type of hairs that are most frequently encountered in casework are naturally shed from dormant follicles in the telogen phase; experimentation has shown that the average person sheds approximately one hundred hairs each day. Due to the lack of nucleated cells in their roots, telogen hairs without follicular tissue are often not suitable for nuclear DNA analysis. However, these hairs may contain sufficient mitochondrial DNA in their roots and shafts for analysis at an outside laboratory.

When evidence is examined for biological substances, apparent hairs may be collected from the item, collected from the item and examined, or left on the item for possible future collection and examination. This decision is based on the laboratory examination request and/or whether the information gained may reasonably be expected to provide probative information for the case. Apparent hairs that are present, but not the focus of an examination (e.g. on an item being swabbed for possible residual DNA in a property crime), do not need to be noted or reported.

B. QUALITY CONTROL

Not applicable

C. SAFETY

- C.1 Treat all biological samples as potentially infectious. Gloves, a face mask, and a lab coat must be worn. Additionally, eye protection (e.g. safety glasses or a face shield) must be worn if applicable.

- C.2 Distinguish all waste as general, biohazard or sharps and discard appropriately.

Document ID	Revision	Approval	Date Published
1592	9	Supervising Criminalist - Biology	8/7/2019 8:58:57 AM

D. REAGENTS, STANDARDS, AND CONTROLS

D.1 Xylene

D.2 Deionized Water

D.3 Permout

D.4 Bleach-based cleaner, e.g. Clorox Bleach Germicidal Cleaner (Decontamination)

D.5 70% Reagent Alcohol (Decontamination)

E. EQUIPMENT

E.1 Post-it notes

E.2 Forceps

E.3 Microcentrifuge tube

E.4 Clear packaging tape

E.5 Clear plastic sheets

E.6 Microscope slides

E.7 Coverslips

E.8 Glassine envelopes

E.9 Over-sized spatula

F. PROCEDURES

F.1 With the aid of appropriate lighting and/or magnification apparent hairs may be recovered from items and examined using one or more of the following methods: forceps, post-it notes, or clear packaging tape. Tape lifts are especially useful for large or dark colored items on which it may be difficult to visually locate apparent hairs.

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1592	9	Supervising Criminalist - Biology	8/7/2019 8:58:57 AM

- F.2 Tape lifts should be placed on clear plastic sheets while post-it notes can be folded on themselves or packaged in glassine envelopes or bindles.
- F.3 Label the packaging with the lab number, item number, date, and examiner's initials.
- F.4 Apparent hairs can be removed from tape lifts for examination using forceps or by dissolving the tape adhesive with xylene.
- F.5 When appropriate, apparent hairs can be further characterized using visual/macroscopic examination to determine length, overall color, and general shape if readily apparent (e.g. curly, straight)
- F.6 Stereomicroscopic and/or transmitted light microscopic examination can be used to attempt to determine information about its root if present (e.g. forcibly removed, suitable for nuclear DNA analysis). Furthermore, this type of examination can also show whether any trace material is adhering to an apparent hair or if any significant damage is present. If foreign material of possible evidential value is observed, the examiner should consider removing and preserving this for possible future analysis. Photography may be used to document this material prior to its removal or also any other significant characteristics observed such as damage by crushing or burning.
- F.7 For microscopic examination, temporarily mount the apparent hair using deionized water or xylene. Apparent hair may also be semi-permanently mounted using Permunt. If apparent hairs need to be taken out of a semi-permanent medium, the slide can be soaked in xylene until the cover slip can be removed.
- F.8 If after examination, an apparent hair is found to possess a root that may be suitable for nuclear DNA analysis and it is determined to be appropriate, remove the root end of the apparent hair and transfer this sample to a labeled microcentrifuge tube that can be referred to the DNA Section.
- F.9 Label and repackage the remaining fragment with the original item.
- F.10 If after examination, an apparent hair is found to possess a root that is not suitable for nuclear DNA analysis, determined to be a fragment or determined to not be an apparent hair, label and repackage it with the original item.
- F.11 The determination of the origin of an apparent hair (e.g. animal vs human or body area of origin) and hair comparison examinations are not performed at the Washoe County Sheriff's Office Forensic Science Division.

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G. INTERPRETATION GUIDELINES

Not applicable

H. REFERENCES

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- H.2 Deedrick, D.W., Koch, S.L., "Microscopy of Hair Part 1: A Practical Guide and Manual for Human Hairs," *Forensic Science Communications*, 2004, 6(1).
- H.3 Hicks, J. *Microscopy of Hair: A Practical Guide and Manual*, Federal Bureau of Investigation, U.S. Government Printing Office, Washington, D.C., 1977.
- H.4 Petraco, N., Fraas, C., Callery, F.X., De Forest, P.R., "The Morphology and Evidential Significance of Human Hair Roots," *Journal of Forensic Science*, 1988, 33(1): 68-76.
- H.5 Scientific Working Group on Materials Analysis, "Forensic Human Hair Examination Guidelines," *Forensic Science Communications*, April 2005, 7(2).

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